

REMARKS

Claims 1-21 and 40-58 are pending in the application. Applicant expresses appreciation for the allowance of claims 55, 57, and 58.

Claim 56 stands rejected under 35 U.S.C. 112, second paragraph, as being indefinite. Page 2 of the Office Action states that claim 56 does not further limit claim 55 from which it depends. However, Applicant notes that claim 56 does indeed further limit the range of composition possible for the first capacitor plate. Claim 55 sets forth that the first plate comprises a first metal selected from the group consisting of Pt and Ru. That is, the first plate contains a first metal but is open to containing other materials. The first metal is selected from Pt and Ru. Claim 56 further limits the composition of the first plate by stating that it consists of Pt or Ru. That is, in claim 56, the first plate does not contain any materials other than Pt or Ru. At least for such reasons, Applicant requests withdrawal of the claim 56 rejection in the next Office Action.

Claims 1-21 and 40-54 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Suntola in combination with Yu or Marscher. Applicant requests reconsideration.

Claim 1 sets forth an interface forming method that includes, among other features, chemisorbing an interface layer on and in contact with a first layer containing a first metal. The interface layer includes at least two monolayers that each have the first metal intermixed with a second metal different from the first metal. The method includes forming a second layer containing the second metal on and in contact with the interface layer and improving adhesion between the first layer and the second layer compared to adhesion otherwise occurring with the second layer formed on and in

contact with the first layer in the absence of the interface layer. Pages 3-4 of the Office Action allege that Suntola discloses every limitation of claim 1 except for forming the interface layer between a first element layer and a second element layer. However, the Office Action asserts either that it would be obvious to form the interface layer between the first layer and the second layer or that Yu or Marscher discloses the subject matter missing from Suntola. Applicant traverses.

Applicant acknowledges that Suntola pertains generally to atomic layer epitaxy but asserts that Suntola fails to disclose or suggest the compositional relationship set forth in claim 1. According to such relationship, the first layer contains a first metal, the interface layer contains the first metal and a second metal different from the first metal, and the second layer contains the second metal. The claimed compositional relationship enables the step of improving adhesion between the first layer and the second layer, as also set forth in claim 1. Suntola fails to disclose or suggest the advantage provided by such a compositional relationship.

Claim 1 does not merely set forth providing the interface layer between any first layer and any second layer as alleged on page 3 of the Office Action in paragraph 5(a). Instead, the interface layer containing at least two monolayers that each have a first metal intermixed with a second metal different from the first metal is provided between a first layer and a second layer expressly set forth as possessing particular advantageous compositions. Namely, the first layer contains the first metal and the second layer contains the second metal. Accordingly, any allegation that it is obvious for a person of ordinary skill to practice the claimed method by providing at least two Suntola monolayers between a first layer and a second layer ignores the express limitations set forth in claim 1.

The Office Action does not provide any support for the allegation that Suntola alone discloses or suggests the compositional relationship set forth in claim 1. Applicant asserts that Suntola further does not disclose or suggest the step of improving adhesion set forth in claim 1. At least for such reason, claim 1 is patentable over Suntola considered alone.

Page 4 of the Office Action alleges that Yu discloses the compositional relationship set forth in claim 1. Applicant acknowledges that Yu pertains to a single atomic layer as an interface between monocrystalline silicon and monocrystalline metal oxide to promote epitaxial growth of the metal oxide. However, the substrate on which the Yu single atomic layer is formed does not contain a metal since it is monocrystalline silicon. Page 4 of the Office Action erroneously states that "a layer of BaO or SrO can be applied to a substrate prior to the interface layer being applied thereto and a subsequent layer can be applied to the interface layer."

Apparently, the Office Action is making reference to column 3, lines 30-34 of Yu. However, the relied upon text states that the BaO or SrO layer "may be placed between the interface 14 and the single crystal oxide." It is clear from the entire context of such statement in column 3, lines 30-38 that the "single crystal oxide" is not the monocrystalline substrate but is instead layer 26 that is formed after forming interface 14 on Si substrate 10. Accordingly, Yu does not teach that a layer of BaO or SrO can be applied to a substrate prior to the interface layer being applied thereto. At least for such reason, Yu fails to disclose or suggest the compositional relationship set forth in claim 1 where a first layer contains a first metal, an interface layer contains the first metal and a second metal, and a second layer contains the second metal. Instead, Yu only applies to the circumstance of an interface between a monocrystalline silicon

substrate and a monocrystalline metal oxide. The teachings of Yu are specially adapted to promote epitaxial growth of the metal oxide by providing the interface layer and, by comparison, claim 1 provides a different advantage of improving adhesion.

Applicant additionally asserts that Yu does not disclose or suggest at least two monolayers that each have the first metal intermixed with a second metal different from the first metal. Yu interface 14 merely includes a single atomic layer specifically designed to provide the structural transition shown in Fig. 13 and discussed in the text associated therewith. The Office Action does not support any allegation that Yu discloses or suggests more than the single atomic layer as interface 14. Yu does not provide any discussion of whether or not an appropriate structural transition can be established, such as shown in Fig. 13, if interface 14 contains more than a single atomic layer. Applicant asserts that the effectiveness of the teachings of Yu depends upon the presence of a single atomic interface layer between monocrystalline silicon and monocrystalline metal oxide as may be appreciated from Fig. 13 of Yu. At least for such reason, Yu does not disclose or suggest the at least two monolayers of first metal intermixed with a second metal, as set forth in claim 1.

Given the deficiencies of Yu discussed above, combination of Suntola and Yu still fails to disclose or suggest every limitation of claim 1 since both are deficient in the same respects. At least for such reason, claim 1 is patentable over Suntola in view of Yu.

Page 4 of the Office Action also relies upon Marscher as allegedly teaching gradient layers between metal and ceramic layers with the acknowledgement that Marscher does not disclose chemisorption for forming the gradient layers. Applicant asserts that Marscher pertains to relief of thermal expansion differences in gas turbine

seals. However, Marscher applies to a distinctly different art area compared to Suntola and/or Yu. A person of ordinary skill viewing the teachings of Suntola and/or Yu and attempting to solve the problem of improving adhesion by modifying such references would not look to Marscher for teachings that might be suitable to modify Suntola and/or Yu and solve such adhesion problems. The relief of thermal expansion differences in gas turbine seals addressed in Marscher is so unrelated to atomic layer epitaxy in Suntola and promoting epitaxial growth of metal oxide in Yu that Marscher cannot be properly combined with such references. At least for such reason, Applicant asserts that claim 1 is patentable over the cited combination of references.

Claims 2-7 and 40-45 depend from claim 1 and are patentable at least for such reason as well as for the additional limitations of such claims not disclosed or suggested.

Claim 8 sets forth an electronic device interface forming method that includes, among other features, forming an electronic device interface layer between and in contact with a first layer containing a first metal and a second layer containing a second metal different from the first metal. The interface layer is formed separately from forming the first and second layers, contains the first and second metals, and does not substantially contain material from the first or second layers as separately formed. Also, the interface layer improves adhesion between the first layer and the second layer. As will be appreciated from the discussion above regarding the deficiencies of the cited combination of references as applied to claim 1, Suntola considered alone or in combination with Yu or Marscher fails to disclose or suggest every limitation of claim 8.

Specifically, it will be appreciated from the discussion above that Suntola does not disclose the compositional relationship between the first layer, the interface layer, and the second layer set forth in claim 8. Also, Suntola does not disclose improving adhesion as set forth in claim 8. In addition, Yu fails to disclose the first layer containing a first metal, the interface layer containing the first and second metal, and the second layer containing the second metal. Further, claim 8 sets forth an electronic device interface forming method that includes forming an electronic device interface layer. A person of ordinary skill would not look to the Marscher teachings regarding relief of thermal expansion differences in gas turbine seals to solve adhesion problems between layers in electronic devices, as set forth in claim 8. Accordingly, claim 8 is patentable over the cited combination of references. Claims 9-12 depend from claim 8 and are patentable at least for such reason as well as for the additional limitations of such claims not disclosed or suggested.

Claim 13 sets forth an electronic device interface forming method that includes, among other features, forming a first electronic device layer containing a first metal and chemisorbing at least one monolayer with first and second portions respectively containing first and second different metals on and in contact with the first layer. The at least one monolayer is included in an interface layer. The method includes forming a second electronic device layer containing the second metal on and in contact with the interface layer and improving adhesion between the first layer and the second layer. As may be appreciated from the discussion above regarding the deficiencies of the cited combination of references as applied to claims 1 and 8, such references fail to disclose or suggest every limitation of claim 13. Claims 14-17 depend from claim 13 and are

patentable at least for such reason as well as for the additional limitations of such claims not disclosed or suggested.

Claim 18 sets forth an electronic device interface forming method that includes, among other features, forming a first electronic device layer containing a first metal and chemisorbing first and second unsaturated interface layers respectively containing first and second different metals. The method includes forming a second electronic device layer containing the second metal on the first and second intermixed interface layers. As may be appreciated from the discussion above regarding the deficiencies of the cited combination of references as applied to claims 1 and 8, such references fail to disclose or suggest every limitation of claim 18. Even though claim 18 does not set forth improving adhesion between the first and second electronic device layers, Applicant asserts that other limitations set forth in claim 18 and discussed above as not disclosed or suggested in the cited combination sufficiently distinguish the claim 18 method from the prior art. Claims 19-21 depend from claim 18 and are patentable at least for such reason as well as for the additional limitations of such claims not disclosed or suggested.

Claim 46 sets forth an electronic device interface forming method including, among other features, forming a first electronic device layer containing a first chemical element, chemisorbing on and in contact with the first layer an interface layer containing at least two monolayers, and forming a second electronic device layer containing a second chemical element on and in contact with the interface layer. The interface layer contains the first chemical element intermixed with the second chemical element to provide a composition gradient across a thickness of the interface layer. As will be appreciated from the discussion above regarding the deficiencies of the cited

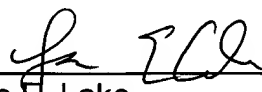
combination of references as applied to claims 1 and 8, such references fail to disclose or suggest every limitation of claim 46.

Specifically, Suntola fails to disclose the compositional relationship set forth in claim 46, including but not limited to the composition gradient across a thickness of the interface. In addition, Yu fails to disclose or suggest the at least two monolayers of the claim 46 interface layer and the composition gradient across a thickness of the interface layer. With only a single atomic layer, it is impossible for interface 14 of Yu to disclose a composition gradient. Further, the Marscher teachings regarding relief of thermal expansion differences in gas turbine seals is not applicable to the electronic device interface forming method of claim 46 and the first and second electronic device layers set forth therein. At least for such reasons, claim 46 is patentable over the cited combination. Claims 47-54 depend from claims 46 and are patentable at least for such reason as well as for the additional limitations of such claims not disclosed or suggested.

Applicant herein establishes adequate reasons supporting patentability of claims 1-21 and 40-58 and requests allowance of all such pending claims in the next Office Action.

Respectfully submitted,

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